

SECRET

Approved For Release 2003/05/14 : CIA-RDP78B05171A000600020044-4

NPIC/TSSG/RED-1891-69
28 October 1969

MEMORANDUM FOR THE RECORD

SUBJECT: Acceptance Tests on Serial Number 1 of the Production Contract for
Dual-Viewing Microstereoscopes (File Number 02137)

1. During the period of 9-11 September 1969 and 1-2 October 1969
acceptance tests were performed on the first of ten Dual-Viewing Microstereo-
scopes to be fabricated by [redacted] under Contract [redacted]
[redacted]

2. Attached is a transcript of the results of these tests. The instru-
ment proved acceptable and was shipped to NPIC, being received in the building
on 16 October 1969.

[redacted]
SDB/RED/TSSG

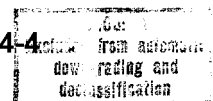
Distribution:

- Original - Route & File
- 1 - NPIC/TSSG/RED
- 2 - NPIC/TSSG/RED/SDB

Declass Review by NIMA/DOD

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SECRET



DUAL-VIEWING MICROSTEREOSCOPE

S/N - 1

ACCEPTANCE TESTS

Performed - 9, 10, 11 September 69
1, 2 October 69

Observers



25X1

LIGHT INTENSITY

<Observed 9-11-69>

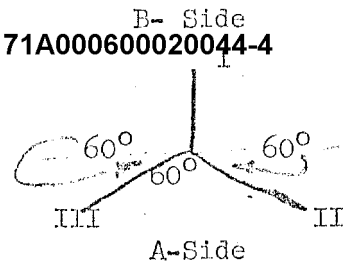
Instrument -
Spectra Brightness Spot Meter

Prototype - 10,500 ft.-lamberts
S/N-1 - 13,000 ft.-lamberts
Required - $1.5 \times 10,500 = 15,750$ ft.-lambert
Uneven light distribution in spot

<Observed 10-1-69>

Prototype - 10,500 ft.-lamberts
Required - 15,750 ft.-lamberts
Measured S/N-1 - 15,100 ft.-l (left source from A-side)
16,500 ft.-l (right source)
Bulbs replaced - these bulbs had been used for an estimated 20/30
hours. Blackening was evident on the inside of
the glass envelope.
Measured w/new bulbs - 19,500 ft.-l (left source)
22,000 ft.-l (right source)
Light distribution much improved over observation of 9-11-69
High-intensity plus background illumination - OK
High-intensity position adjustment - OK
Variation (50 to 100% required) - 0 to 100%
Color temperature (3500 to 5500°K)
Measured at 50% of 13,000 ft.-l - 3500°K
Illuminated area (7 X 10) - OK

Resolution - Axial



A Observer -
 B Observer -
 Observed 9-11-69
 0° Pechan Setting
 Targets -

Position	Station	Required Eyepiece	Resolution (l/mm)			
			11X	36.3X	57.5X	75X
I	A	L	72	181		323
	A	R	72	181		362
	B	L	57	144		287
	B	R	57	128		287
II	A	L	72	181		362
	A	R	72	181		362
	B	L	57	144		287
	B	R	57	144		287
III	A	L	64	181		323
	A	R	72	181		323
	B	L	57	144*		256
	B	R	57	144		256

Floor Vibration a Problem

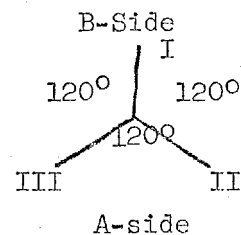
*Observer B views 181 l/mm with aid of diopter telescope. Therefore, all Observer B readings are low.

Rotating rhomboids made no difference in resolution readings at 11X. No further rotating of rhomboids was therefore performed.

Rotation of Pechan prism made no significant difference in resolution readings at 11X. Rotation of the Pechan was performed only occasionally thereafter.

Resolution readings were discontinued because of time and because light intensity was determined to be below specs.

Resolution - Axial



Observer -
 Observed - 10-1-69
 0° Pechan Setting
 Targets - 5-bar

(continued next page)

Required { max 63 109 203 358
min 50 161 238 304

Floor Vibration a Problem

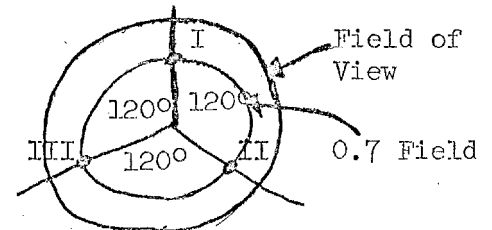
Position	Station	Eye piece	11X	36.3X	57.5X	75X
I	A	L	72	203	280	360
	A	R	72	203	287	360
	B	L	72	203	280	360
	B	R	72	203	280	360
II	A	L	72	Axial positioning made no apparent difference-- determinations discontinued		
	A	R	72			
	B	L	72			
	B	R	72			
III	A	L	72			
	A	R	72			
	B	L	72			
	B	R	72			

Minimums (By rotating Pechan at each position)

B	L	64	181	250	320
B	R	64	181	250	320
A	L	64	181	250	320
A	R	57	181	256	320

Resolution - 0.7 Field

Observer -
Observed 10-1-69
0° Pechan Setting
Targets - 5-bar



Required { max 50 134 200 267
min 50 134 200 240

Position	Station	Eye piece	11X	36.3X	57.5X	75X
I	A	L	64	181	250	280
	A	R	57	161	220	280
	B	L	57	181	220	280
	B	R	64	161	220	280
II	A	L	57	181	250	280
	A	R	64	181	250	320
	B	L	64	181	250	280
	B	R	57	161	220	320
III	A	L	64	161	220	280
	A	R	57	181	220	280
	B	L	64	181	220	320
	B	R	64	181	250	280

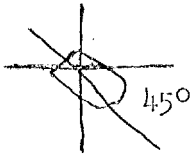
Air Conditioner in Room Turned Off -
Much Less Problem with Vibration

Minimums (Rotating Pechan)

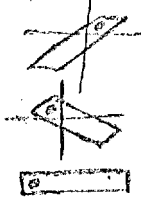
A	L	57	144	220	250
A	R	57	144	200	250
B	L	57	144	200	280
B	R	57	161	200	250

Field of View

Observed 9-10-69
Target - Glass scale

<u>Mag</u>	<u>Position of Rhomboid</u>	<u>Position of Scale</u>	<u>Station</u>	<u>Eyepiece</u>	<u>Field</u>
70X			A	R	2.86 mm
			A	R	2.86
			A	R	2.85
			Pechan Rotation		0°
					90°
					180°
					90°
					0°
					2.85
					2.84
					2.85
					2.84
					2.85
72X				90°	2.85
				180°	2.84
				90°	2.85
				0°	2.85
50X			A	R	4.0
30X			A	R	6.63
11X			A	R	17.99
11X			A	L	18.03
30X			A	L	6.67
50X			A	L	4.01
70X			A	L	2.83
70X				0°	
				90°	
				180°	
				90°	
				0°	
				90°	
				180°	
				90°	
				0°	
					2.83

50X



A

L

4.01

A

L

3.99

70X



B

L

Image Rotation 0°

2.83

120°

240°

360°

480°

600°

720°

2.83

0°

3.99

120°

4.00

240°

4.00

360°

3.99

480°

4.00

600°

4.00

720°

3.99

0°

6.63

50X

30X

11X

120°

240°

360°

480°

600°

720°

6.63

0°

18.02

120°

18.03

240°

18.06

360°

18.02

480°

18.03

600°

18.04

720°

18.02

0°

18.02

0°

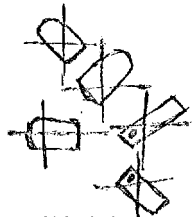
18.02

0°

18.05

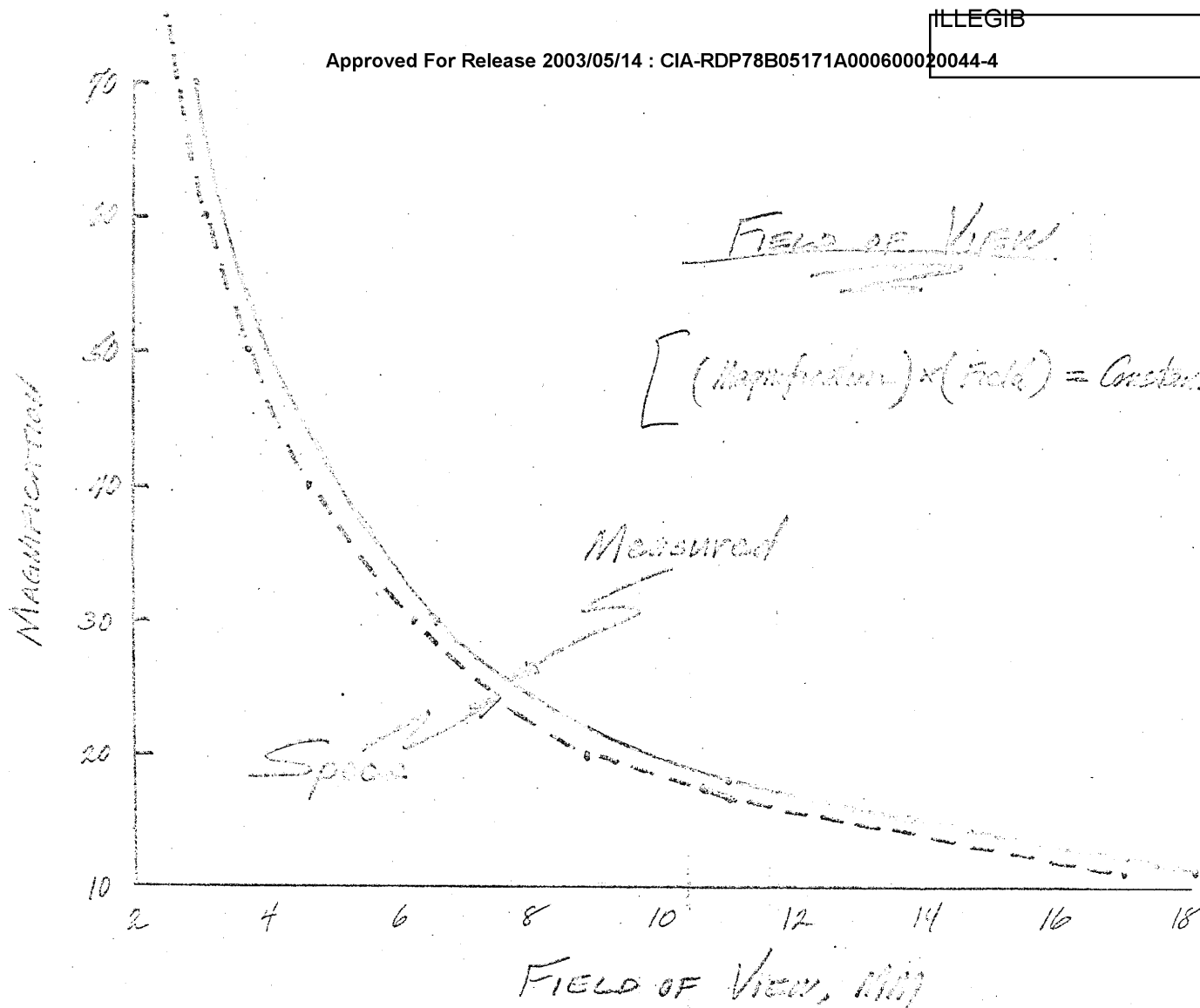
0°

18.08



B Station, Right Eyepiece magnifications cannot be set accurately because of phoria eyepiece. At minimum magnification field = 17.9 mm.

ILLEGIB



Magnification

Observed 9-9-69

Target - Glass scale

0° Pechan Setting

Eye piece -  10X, with 10mm diameter reticle

$$\text{Lgth on scale} = \frac{D_{\text{reticle}} M_{\text{eyepiece}}}{M_{\text{system}}}$$

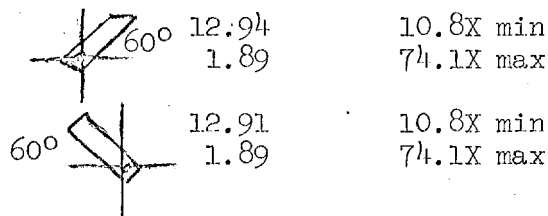
$$= 14 \frac{M_{\text{eyepiece}}}{M_{\text{system}}}$$

<u>Station</u>	<u>Eye piece</u>	<u>Pos. of Scale</u>	<u>Field</u>	<u>Mag</u>
A	R		12.9 mm 1.885	10.85X min 74.3X max

making meas. through glass scale { 12.83
1.89

making meas. with cover glass { 12.9
1.89

Image rotation causes negligible effect



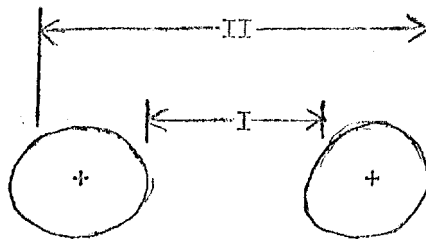
A	L		12.76 1.87	11.0X min 75X max
B	L		12.8 1.87	10.9X min 75X max

Image rotation causes negligible effect.

B R Could not be checked because phoria eyepiece not removable.

Air Base Accommodation
(Distances Between Objectives)

Observed 9-9-69
Target - Glass Scale

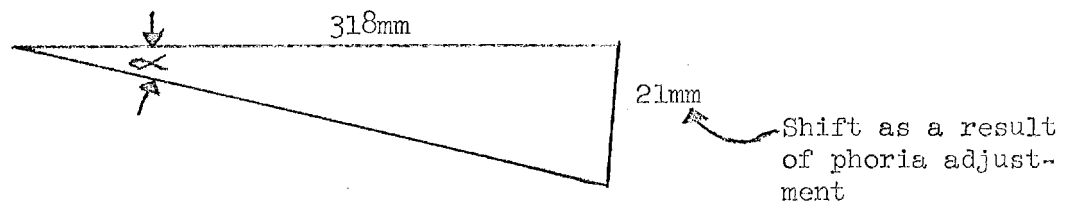


37 mm min
Required 133mm max

<u>Station</u>	<u>IPD</u>	<u>I</u>	<u>II</u>	<u>Ave</u>
A	55mm	132.44mm	137.81mm	135.12mm
	77mm	132.43	137.83	135.13
B	55	132.38	137.72	135.05
	77	132.41	137.74	135.08
A	55	32.00	38.41	35.20
	77	32.00	38.42	35.21
B	55	31.93	37.36	34.64
	77	31.91	37.38	34.64

Vertical Phoria

Observed 9-10-69
Target - Ground glass



$$\alpha = \tan^{-1} \frac{21}{318} = 3.8^\circ$$

Required $+ 1.5^\circ$ min.

Temperature

Observed 9-11-69

Instrument - Dial-Type Thermometer of Unknown Accuracy

High-intensity illumination, background illumination, and pointer illumination left on all night at maximum settings.

Glass surface	- 84° F
ΔX - ΔY table (metal) surface	- 78°
High-intensity Source Shield	- 86°
Ambient Temperature	- 68°

Image Orientation

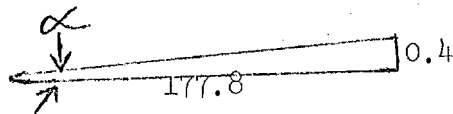
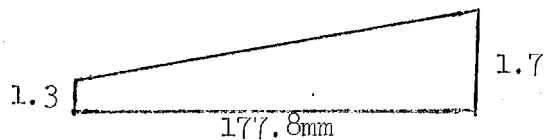
Observed 9-10-69

Target - Imagery, graph paper

Position - up, down, right, left OK

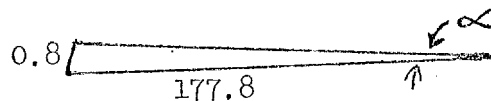
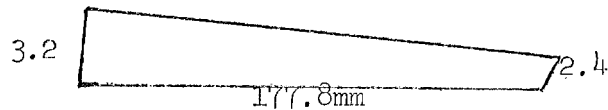
Rotation -

Station A:



$$\alpha = \tan^{-1} \frac{0.4}{177.8} = 7 \text{ min.}$$

Station B:



$$\alpha = \tan^{-1} \frac{0.8}{177.8} = 14 \text{ min}$$

Total angle = $7 + 14 = 21$ min.

Graph Paper Target
0° Pechan Settings

With vertical lines parallel as viewed from Station A, horizontal lines are slightly at an angle, and Station B sees both horizontal and vertical lines at slight angle. Rotation of image rotation knobs allows fusion of sgnares.

IPD Adjustment

Observed 9-9-69
Required - 55 to 77 mm

<u>Station</u>	<u>Min</u>	<u>Max</u>
A	52.35mm	78.75mm
B	52.0	79.0

0.8mm backlash in IPD mechanism at B station observed 9-9-69 was subsequently removed by 10-1-69

Focus

Observed 9-9-69
Required +5 diopters
Instrument - ☐ Diopter Telescope

<u>Station</u>	<u>Eyepiece</u>	<u>Range</u>
A	L	-5 to +4
A	R	-5 to +4
B	L	-5 to +4
B	R	-5 to +4

Diopter telescope only had a range of -5 to +4 but eyepieces each had a range of greater than +4.

Stage Motion

Observed 9-9-69

Required - Common Motion ± 3.5 in. Y
 ± 2.5 in. X

Δ X one Plate ± 1 in.

Δ Y one Plate ± 1 in.

Total motion - $9 \frac{1}{8}$ in. Y

$5 \frac{7}{8}$ in. X

Δ X - 4 in.

Δ Y - 2 in.

Table

Observed 9-9/10-69

Instrument - VOM

Required - 48 X 32

48 X ~~32~~ X 29 - OK

Lockable Casters - OK

Grounded - OK

Reticle Illumination

Observed 9-9-69

Target - Density wedge

Reticle observed with step wedge densities of 0.08 to 2.5 units. Reticle exhibited adequate range of contrast.

A red filter was supplied that was easily removable.

Carrier Plates

Observed 9-9-69

5 X 7 free aperture required on each plate. S/N-1 satisfies this requirement.

Holddown Plates

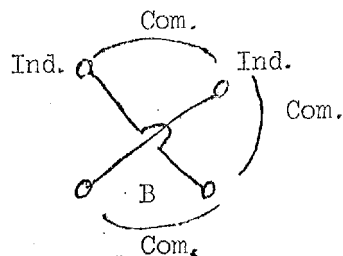
Observed 9-9-69

Two 3 X 4 and two 5 X 7 glass plates were provided. One 5 X 7 plate was chipped on corner and will be replaced.

Common Zoom & Independent Zoom

Observed 9-9-69

Requirement:



S/N-1 satisfies requirement

Image Rotation

Observed 9-9-69

360° Rotation required - S/N-1
satisfies requirement